PERIODICAL
1964

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INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

APPOINTED UNDER A CONVENTION
BETWEEN CANADA AND THE UNITED STATES FOR THE
PROTECTION, PRESERVATION AND EXTENSION OF
THE SOCKEYE AND PINK SALMON FISHERIES IN
THE FRASER RIVER SYSTEM

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ANNUAL REPORT
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NEW WESTMINSTER
CANADA
1965

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

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CANADA	
William A. Found	1937-1939
A. L. Hager	1937-1948
Senator Thomas Reid	1937-
A. J. Whitmore	1939-
Olof Hanson	1948-1952
H. R. MacMillan, C.B.E., D.Sc.	1952-1956
F. D. Mathers	1956-1960
W. R. Hourston	1960-

UNITED STATES	
Edward W. Allen	1937-1951 1957-1957
B. M. Brennan	1937-1942
Charles E. Jackson	1937-1946
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Albert M. Day	1947-1954
Alvin Anderson	1949-1950
Robert J. Schoettler	1951-1957
Elton B. Jones	1951-1957
Arnie J. Suomela	1954-1961
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Clarence F. Pautzke	1961-
George C. Starlund	1961-

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DIRECTOR OF INVESTIGATIONS
LOYD A. ROYAL

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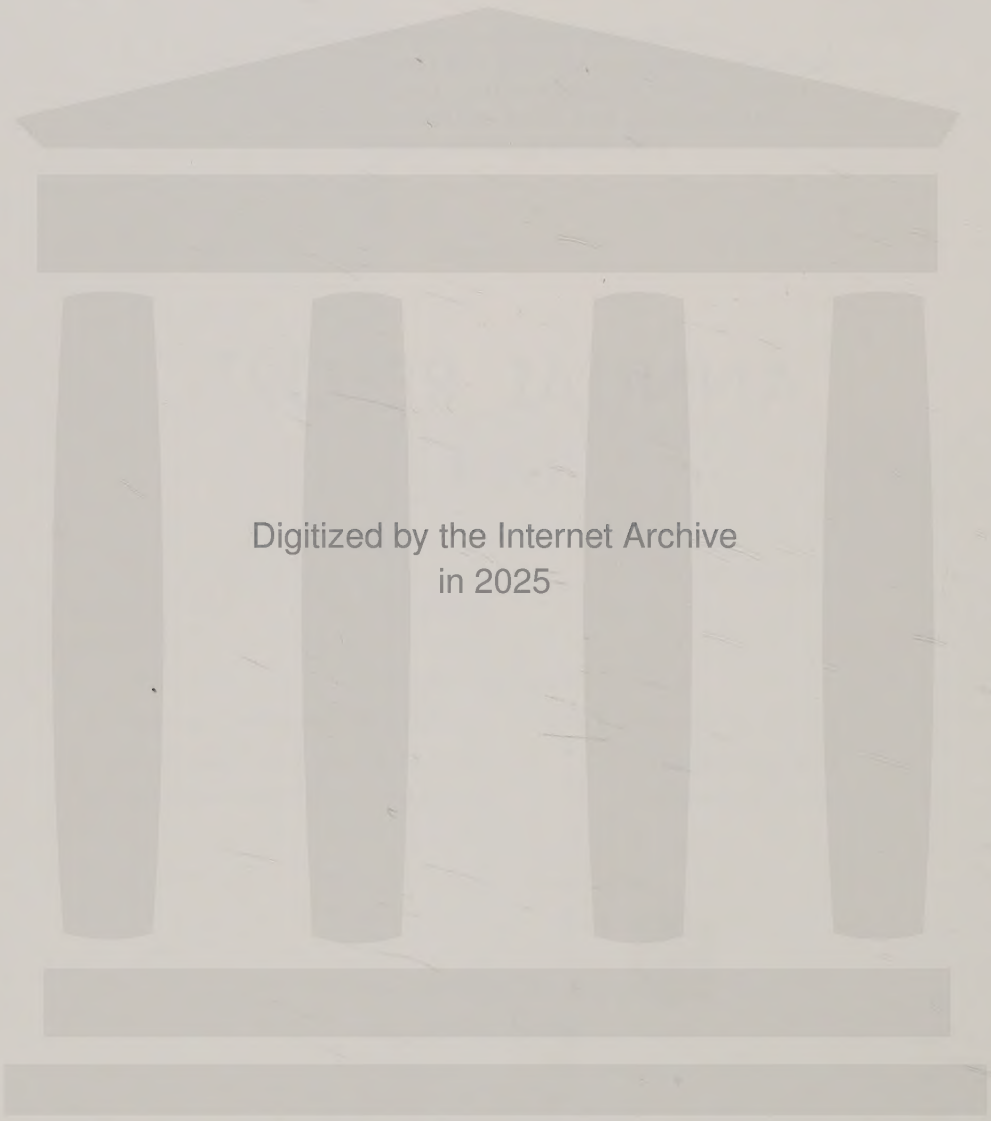
CANADA
1965



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REPORT OF THE
INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION
FOR THE YEAR 1964

The Sockeye Salmon Fisheries Convention as amended by the Pink Salmon Protocol was concluded for the explicit purpose of protecting, preserving and extending the sockeye and pink salmon fisheries of the Fraser River; also that these fisheries should be restored and maintained.

To carry out the purpose of the Convention, the International Pacific Salmon Fisheries Commission was created and granted certain powers as follows: 1. To make a thorough investigation of the natural history of the Fraser River sockeye and pink salmon, hatchery methods, spawning ground conditions, and other related matters. 2. To conduct fish cultural operations, and 3. To investigate and recommend the removal of obstructions. The Commission also was given the power to regulate the fisheries and in doing so to divide the allowable catch as equitably as practicable between the fishermen of the two countries.

The terms of reference of the Commission as stated in the Convention are not always clear in respect to the many problems arising coincident with the rapid multi-purpose development of the Fraser River watershed. For instance, no reference is made in the Convention to the problem of pollution which in recent years has assumed major proportions in the form of industrial effluent, insecticides, herbicides, and the wastes from the rapidly increasing towns and municipalities.

Since the work of the Commission is affected significantly by such factors as pollution the Commission has been guided over the years by the declared purpose of the Convention rather than by its specific terms of reference. Thus, while the Commission recognizes that it has no legal powers to enforce regulations of any kind it has carried out investigations that appeared necessary to form a basis for the preservation and extension of the Fraser River sockeye and pink salmon fisheries. In other words, the Commission has considered it obligatory to obtain factual information on any newly arising situation which might prevent the fulfilment of the purpose of the Convention; such a policy would naturally include the investigation of pollution problems in the Fraser River watershed.

The Commission, in considering staff size limitations, has recognized that it would be impossible for it to assume the responsibility for obtaining solutions to all unsolved salmon problems with which it is faced; especially since many, if not all, of these problems exist elsewhere. Since there must be a limit to staff growth the Commission has established certain principles with regard to its investigational work.

1. Factual information must be obtained when required to support recommendations for action on the part of the respective governments to protect and preserve the Fraser River sockeye and pink salmon fisheries.

2. To collect and collate all available research data that appear to be useful and adapt them for application to the Commission's problems.

3. To initiate any new research that appears to be required and to stimulate other research groups to continue in the same specific field.

4. In recruiting or replacing staff, to accent type of training, character and leadership qualities to produce direction and purposeful results.

Initially, in the history of the Commission, the Fraser River watershed consisted mainly of 'wilderness' and the principal problem of restoring the sockeye runs was one of finding the cause of the original decline and how to manage the fisheries on a scientific basis. Because of these relatively virgin watershed conditions the Commission's work originally was the dominant influence in the Fraser River sockeye fisheries. In recent years the situation has changed drastically. Towns and municipalities are doubling in size in a period of a few years. Industries of almost every conceivable nature either have been or will be built. Diversion and use of Fraser River water has increased substantially and will continue to increase rapidly in the immediate years to come.

Most of these developments result in control or protective facilities, required by the governmental agencies involved, and their operation for the protection of fisheries must be supervised or checked by organizations other than the Commission. Likewise, the spawning escapement which now passes through populated areas must be protected from any unlawful fishing operations. Thus it is axiomatic that the protection of the Fraser River sockeye and pink salmon fisheries will become an increasing responsibility of those government agencies having the legal responsibility which the Commission does not and cannot have as an international agency. To date this unusual relationship between the Commission and the national and provincial government entities, particularly the Canada Department of Fisheries, has been highly effective in protecting the sockeye and pink salmon fisheries of the Fraser River. Only time will tell whether this unique approach to the protection of the salmon fisheries of the Fraser River system will continue to be more effective than that used during the development of large river systems elsewhere.

COMMISSION MEETINGS

The International Pacific Salmon Fisheries Commission held twelve formal meetings during 1964 with the approved minutes of these meetings being submitted to the Governments of the United States and Canada. The first meeting of the year was held on January 15 and 16 with Mr. DeWitt Gilbert serving as Chairman and Senator Thomas Reid as Vice Chairman and Secretary. On January 16 the Commission met with its Advisory Committee composed of the following members:

Canada	*United States*
Peter Jenewein Gill Net Fishermen	Vernon Blake Gill Net Fishermen
Richard Nelson Salmon Processors	John Plancich Salmon Processors
Charles Fletcher (alternate for Charles Clarke) Purse Seine Fishermen	N. Mladinich Purse Seine Fishermen
H. Stavenes Purse Seine Crew Members	John Brown Reef Net Fishermen
R. H. Stanton Troll Fishermen	F. Bullock (absent) Troll Fishermen
J. C. Murray Sport Fishermen	Howard Gray Sport Fishermen

The tentative recommendations for regulatory control of the 1964 sockeye and pink salmon fishery in Convention waters as submitted to the Advisory Committee by the Commission on December 18, 1963, were reviewed and certain revisions made on the basis of the representations of the Advisory Committee. Mr. Vernon Blake was welcomed as the United States Advisory Committee representative of the gill net fishermen filling the vacancy left by the resignation of Mr. J. Erisman. Consideration was given to the growing concern of members of the Advisory Committee over the virtually unrestricted high seas troll fishery for pink and sockeye salmon.

On May 7 and 8, 1964, the Commission met at Kamloops, British Columbia, with its Advisory Committee and interested members of the industry who observed the downstream migration of sockeye smolts resulting from the large sockeye escapement to Adams River in 1962. Inspections were made of the Royalite Oil Company Refinery to learn the techniques employed to curtail water pollution and of the site of the newly proposed kraft pulp mill near Kamloops, B. C. Meeting with the Advisory Committee on May 8, full reports were made of current and proposed fishway construction for the watershed; the background and present status of negotiations in regard to pollution control facilities with the companies planning kraft pulp mills at Prince George and Kamloops on the Fraser watershed; the objectives of the pollution studies being conducted at the Sweltzer Creek Field Station; preliminary findings and the continuing program of study on the causes of pre-spawning mortality in adult sockeye. Also reviewed was the operation for determining fry survival rates for pink salmon eggs deposited naturally in the Seton Creek spawning channel, for sockeye eggs planted artificially in the Pitt River incubation channel and for pink salmon spawning in the lower Fraser River. The operational and construction budget for the 1965-1966 fiscal year was approved for submission to the two governments.

On June 29 and 30, 1964, the Commission met in executive session for a review of general operating problems. Of special interest were reports on the status of the appropriations by the two governments for construction during the fiscal year 1965, acquisition of land and water rights for the Weaver Creek Artificial Spawning Channel, enumeration of Fraser River pink salmon fry and Adams River sockeye migrants with a limited discussion on potential adult return of each population. A report on the success of the sockeye fry emergence from the Pitt River artificial incubation channel was given with

a comparison being made of the fry quality with that of fry produced from natural spawning in Pitt River. The Commission also reviewed a preliminary staff report on the catch of pink salmon by the high seas troll fishery and the regulatory problems in connection therewith.

The Commission again met in executive session on July 16, 1964, to review the revised draft of a report for eventual submission to the two national governments on the problems involved in the regulation of the high seas troll fishery for pink salmon. The observed efficiency of the Yale high level fishways and the rock cut at Hell's Gate in passing sockeye and the effect of the highest prevailing water levels in the Fraser River since 1920 on the sockeye escapement were discussed. The size of the 1964 sockeye run and available fishing gear was considered and additional fishing time was approved for both countries. The desirability of spawning channels for the Upper Nadina and North Thompson River systems was considered.

Separate meetings of the Commission were required on July 28, August 4, 10, 12 and 17, 1964 to provide for adjustment of the regulatory controls on the sockeye fishery in an effort to achieve the desired escapement and an equitable division of the allowable sockeye catch between the fishermen of the two countries.

On August 31, 1964, the Commission met in executive session to consider all of the ramifications of the potentially disastrous slide which had occurred in the lower Chilcotin River on August 19, 1964 immediately in advance of the principal Chilko escapement. Agreement was reached for continuing the necessary observations and working with the Canada Department of Fisheries in making any corrections that mutually might be deemed advisable.

The next executive session of the Commission was held on November 2, 1964, when a considerable range of subjects were dealt with, including: 1. A proposal to drive logs down the Stellako River. After reviewing the effects of such operations on other streams the Commission voiced unanimous opposition to the driving of logs over any sockeye and pink salmon spawning grounds except those existing in the main Fraser and Thompson Rivers, 2. A summary report of the engineers from the Department of Fisheries of Canada and the Commission pertaining to recommendations for future action relating to the slide in the Chilcotin River, 3. A review of the escapements to Chilko and other sockeye spawning grounds in relation to the Chilcotin slide and the unprecedented high water levels of the Fraser River during early August, 4. The preliminary findings of mortality studies of Fraser River sockeye conducted during the 1964 spawning season, 5. Approval of the revisions to a report for submission to the two national governments on the regulatory problems of the troll fishery for pink salmon on the high seas within Convention waters, 6. The progress towards actual construction of the Weaver Creek Artificial Spawning Ground, 7. The status of negotiations by the Canada Department of Fisheries with the three companies in the Kamloops and Prince George areas regarding pollution prevention and waste treatment at their proposed pulp mills, and 8. Limnological studies presently

being conducted on Kamloops Lake and the Fraser River at Prince George to ascertain the effects of any future pollutants.

The twelfth and final meeting of the year was held on December 9, 10 and 11, 1964, with the first day devoted to general business. On the second day the Commission met with the Advisory Committee for a full review of the report submitted to the two national governments on the high seas troll fishery for pink salmon. On December 11, 1964, the annual open meeting was held with the Advisory Committee and approximately 600 members of the fishing industry at which time the characteristics of the 1964 fishing season, a summary of possible factors influencing the size of the 1965 sockeye and pink salmon runs in Convention waters and the tentative proposals for regulation of these fisheries were presented for further consideration by the Advisory Committee and their respective segments of the fishing industry.

1964 REGULATIONS

Recommendations for regulations governing the 1964 sockeye and pink salmon fishery in Convention waters were adopted at a meeting of the Commission held on January 16, 1964 and submitted to the two national governments for approval and to the State of Washington for implementation on January 30, 1964. The recommendations for Canadian Convention waters were implemented by the Government of Canada by an Order-in-Council dated March 26, 1964 and for United States Convention waters by an Order of the Director of the Washington State Department of Fisheries on April 24, 1964.

The recommendations of the Commission were as follows:

Canadian Convention Waters

"The International Pacific Salmon Fisheries Commission appointed pursuant to the Convention between Canada and the United States of America for the protection, preservation and extension of the Sockeye Salmon Fisheries of the Fraser River System, signed at Washington on the 26th day of May, 1930, as amended by the Pink Salmon Protocol signed at Ottawa on the 28th day of December, 1956, hereby recommends that regulations to the following effect, in the interests of such fisheries, be adopted by Order-in-Council as amendments to the Special Fishery Regulations for British Columbia, for the season of 1964 under authority of the Fisheries Act, namely:

1. No person shall fish for sockeye or pink salmon in the waters of the southerly portion of District No. 3 embraced in Area 20 and that portion of Area 19 lying westerly of a straight line drawn across Juan de Fuca Strait joining William Head and Angeles Point through Race Rocks commencing at point of intersection with the international boundary line with nets from the 28th day of June, 1964, to the 15th day of August, 1964, both dates inclusive.

2. No person shall fish for sockeye or pink salmon in the waters of the southern portion of District No. 3 embraced in Areas 17 and 18 and that portion of Area 19 lying easterly of a straight line drawn across Juan de Fuca Strait joining William Head and Angeles Point through Race Rocks commencing at point of intersection with the international boundary line and in the waters of District No. 1 by means of nets:

(a) From the 28th day of June, 1964, to the 11th day of July, 1964, both dates inclusive, except for those sockeye or pink salmon taken in gill nets having mesh of not

less than 8 inches extension measure for linen and 8½ inches for synthetic fibre nets as authorized for the taking of spring salmon by the Area Director of Fisheries for British Columbia and pursuant to the provisions of the British Columbia Fishery Regulations.

(b) From the 12th day of July, 1964, to the 26th day of September, 1964, both dates inclusive, except from eight o'clock in the forenoon of Monday to eight o'clock in the forenoon of Tuesday of each week.

3. No person shall fish for sockeye or pink salmon by means of commercial hook and line gear in the Convention waters of Canada (Howe Sound not included) lying easterly and inside of a line projected from Gower Point at the northerly entrance to Howe Sound to Thrasher Rock light, thence in a southeasterly direction to Salamanca Point on the southerly end of Galiano Island, thence in a straight line to East Point on Saturna Island, thence in a straight line towards Point Roberts light to its intersection with the international boundary line, thence following the international boundary line to its intersection with the mainland from the 23rd day of August, 1964, to the 26th day of September, 1964, both dates inclusive, except at such times that net fishing other than with spring salmon nets may be permitted within this area.

All times hereinbefore mentioned shall be Pacific Daylight Saving Time."

United States Convention Waters

"The International Pacific Salmon Fisheries Commission appointed pursuant to the Convention between Canada and the United States of America for the protection, preservation and extension of the Sockeye Salmon Fisheries in the Fraser River System, signed at Washington on the 26th day of May, 1930, as amended by the Pink Salmon Protocol signed at Ottawa on the 28th day of December, 1956, hereby recommends to the Director of Fisheries of the State of Washington, that regulations to the following effect in the interests of such fisheries, be adopted by him for the year 1964 by virtue of authority in him vested by Section 6 of Chapter 112 of the Laws of the State of Washington of 1949, namely:

1. No person shall fish for sockeye or pink salmon in the Convention waters of the United States of America lying westerly of a straight line drawn from Angeles Point in the State of Washington across Race Rocks to William Head in the Province of British Columbia with nets from the 28th day of June, 1964, to the 15th day of August, 1964, both dates inclusive.

2. (1) No person shall fish for sockeye or pink salmon in the Convention waters of the United States of America lying easterly of a straight line drawn from Angeles Point in the State of Washington across Race Rocks to William Head in the Province of British Columbia with purse seines or reef nets:

(a) From the 28th day of June, 1964, to the 11th day of July, 1964, both dates inclusive; and

(b) From the 12th day of July, 1964, to the 29th day of August, 1964, both dates inclusive, except from five o'clock in the forenoon to nine o'clock in the afternoon of Monday and Tuesday of each week.

(2) No person shall fish for sockeye or pink salmon in the waters described in subsection (1) of this section with gill nets:

(a) From the 28th day of June, 1964, to the 11th day of July, 1964, both dates inclusive; and

(b) From the 12th day of July, 1964, to the 8th day of August, 1964, both dates inclusive, except from

(i) seven o'clock in the afternoon of Monday to nine o'clock in the forenoon of Tuesday; and

(ii) seven o'clock in the afternoon of Tuesday to nine o'clock in the forenoon of Wednesday of each week.

(c) From the 9th day of August, 1964, to the 29th day of August, 1964, both dates inclusive, except from

(i) seven o'clock in the afternoon of Sunday to nine o'clock in the forenoon of Monday; and

(ii) seven o'clock in the afternoon of Monday to nine o'clock in the forenoon of Tuesday of each week.

3. Section 2 above does not apply to sockeye or pink salmon taken in nets having mesh of not less than 8½ inches extension measure from the 28th day of June, 1964, to the 11th day of July, 1964, both dates inclusive, when and where such net fishing gear has been authorized for the taking of chinook salmon by the Director of Fisheries of the State of Washington.

4. No person shall fish for sockeye or pink salmon in the Convention waters of the United States of America lying westerly of a straight line drawn from the Iwersen dock on Point Roberts in the State of Washington to the flashing white light on Georgina Point at the entrance to Active Pass in the Province of British Columbia from the 30th day of August, 1964, to the 19th day of September, 1964, both dates inclusive.

All times hereinbefore mentioned shall be Pacific Daylight Saving Time.

In making the above recommendations for regulatory control of sockeye and pink salmon fishing in the Convention waters of the United States of America for the year 1964, the Commission recognizes the need for the continued maintenance of certain preserves previously established by the Director of Fisheries of the State of Washington for the protection and preservation of other species of food fish."

Emergency Amendments

In order to provide for adequate racial escapements of Fraser River sockeye and for an equitable share of the season's catch by the fishermen of Canada and the United States in view of developing runs and fishing operation, the approved regulations as detailed above were later amended on recommendation of the Commission. A detailed list of the regulatory amendments is as follows:

July 16, 1964 — In view of the relatively small fishing fleet operating in United States Convention waters and the prevailing high water levels in the Fraser River associated with an anticipated reduction in the efficiency of the Fraser River gill net fleet, 24 hours of fishing time was approved in both United States and Canadian Convention waters lying easterly of the William Head-Angeles Point line.

July 27, 1964 — Since current evidence indicated a larger sockeye run than previously anticipated and in the interest of equitable division of the allowable catch, an additional 24 hours fishing, effective July 28, was approved in Canadian Convention waters lying easterly of the William Head-Angeles Point line.

July 28, 1964 — Further evidence indicated the sockeye run was still increasing in magnitude so fishing time was increased an additional 24 hours, effective July 29, in Convention waters of the United States and Canada lying easterly of the Angeles Point-William Head line.

August 3, 1964 — In order to permit a proper harvest of Fraser River sockeye and to aid in the equitable division of the catch fishing time was extended by 24 hours, effective August

4, in all Canadian Convention waters lying easterly of the William Head-Angeles Point line.

August 4, 1964 — In the interest of allowing an adequate harvest of Chilko sockeye by the small United States fleet, fishing time was increased by 24 hours, effective August 5, in United States Convention waters lying easterly of the Angeles Point-William Head line. To provide for equitable division of the catch a further 24 hours fishing time, effective August 5, was permitted in Canadian Convention waters lying easterly of the William Head-Angeles Point line. Also on this date action was taken to obtain a timely escapement during the following weekend closure by delaying the opening of United States Convention waters until 7:00 p.m. August 11 and in Canadian waters until 6:00 p.m. August 11; all waters affected lying easterly of the Angeles Point-William Head line.

August 10, 1964 — As the desired escapement had not been achieved by this date the weekly opening in United States Convention waters was delayed by 24 hours to 7:00 p.m. August 12 and by an additional 14 hours in Canadian Convention waters to 8:00 a.m. August 12; all waters affected lying easterly of the Angeles Point-William Head line.

August 12, 1964 — In the interest of equitable division of the catch an additional 24 hours of fishing was permitted, effective August 13, in Canadian Convention waters lying easterly of the William Head-Angeles Point line.

August 17, 1964 — To achieve equitable division of the catch and a proper harvest of the Fraser River sockeye run, one additional day's fishing per week was allowed during the period August 16 to September 13 in Canadian Convention waters. For the same reasons one additional day's fishing per week for two weeks was granted in United States Convention waters effective August 19 and 26; all waters affected lying easterly of the William Head-Angeles Point line.

September 8, 1964 — To provide an adequate escapement of late running sockeye no fishing was permitted in Canadian Convention waters during the week commencing September 13.

The Commission relinquished control in United States Convention waters lying easterly of the Angeles Point-William Head line on August 30 with the exception of the waters lying westerly of a line projected from Iwersen's dock on Point Roberts towards Georgina light at Active Pass to the intersection with the international boundary where regulatory control was retained until September 20. With relinquishment of regulatory control in Canadian Convention waters lying easterly of the Angeles Point-William Head line on

September 27 the Commission's regulatory obligations were fulfilled for the year 1964.

SOCKEYE SALMON REPORT

The Fishery

The Chilko sockeye run has been the major contributor to the 1964 cycle run of Fraser River sockeye for many years. Catches of sockeye on this cycle were particularly good in the preceding cycle years of 1960, 1956, 1952 and 1948 (Table II). A detailed discussion was presented in the 1963 Annual Report to the effect that a poor sockeye run was to be expected in 1964 in spite of a well-balanced escapement in the brood year (1960) followed by the largest number of smolts ever recorded leaving Chilko Lake.

In 1960, approximately 2,258,000 sockeye of Chilko origin returned from a seaward migration of 29,000,000 yearlings and two-year-olds. In 1964, only about 960,000 Chilko sockeye returned from a seaward migration of 36,300,000 yearlings and two-year-old fish. In spite of an increase of 25.2 per cent in the number of seaward migrants over that of the brood year to produce the Chilko sockeye run in 1964, this run actually declined 58 per cent. A slight increase of four per cent occurred in the size of the combined non-Chilko sockeye populations in 1964 indicating that something adversely influenced the Chilko population that was not operative on the other populations. It appears that the management of the Fraser River sockeye populations involves factors other than the simple regulation of the catch, the obtaining of escapement and the numerical success of reproduction. It also appears that the logic, as detailed in the 1963 Annual Report, regarding the anticipated decline in the 1964 Chilko sockeye population is substantiated.

The 1964 total catch of 1,023,000 Fraser sockeye represents a decline of 58.3 per cent from the brood year catch of 2,454,000. In spite of the major decline in the 1964 sockeye catch, the recorded harvest was significantly greater than that anticipated. The maximum anticipated catch was 300,000 sockeye for each country compared with an actual catch of slightly over 500,000 in each case. This error in prediction was caused mainly by an under-estimation of the expected size of the non-Chilko runs, with an unusual number of five and three-year-old sockeye further contributing to the surplus in the expected size of the season's run.

In view of the poor sockeye run predicted for 1964, the major share of the United States fishing fleet decided to fish in the Alaska fishery. This emigration of boats combined with the unexpected increase in the size of the Fraser River run resulted in a substantial improvement in the income of the fishermen who stayed to fish in Convention waters. Four extra fishing days were granted United States fishermen, two of which were permitted during the peak of the sockeye run.

In the Canadian fishery, a substantial number of fishermen emigrated to and fished in the northern part of the Canadian West Coast. To achieve

division of the catch in Convention waters, in view of the closure of the Juan de Fuca Strait fishery, and the unexpected increase in the sockeye run, eight additional days of fishing were granted the fishery in the Fraser River and adjacent waters. The reduced number of Canadian Convention water fishermen, and the additional fishing time allowed, resulted in a rather successful fishing season for those Canadian fishermen who remained in Convention waters.

The timing of the run was normal for this cycle (Tables III and IV) and the catch, slightly in favor of Canada, was divided almost equally between both countries. The United States catch totalled 508,087 sockeye while the Canadian catch was 514,548 (Table II), a difference of only 6,461 fish. The average weight of the four-year-old fish was 5.83 pounds, up from 5.19 pounds in 1960, and approaching the long term cyclical average of 6.06 pounds. The increase in the 1964 average sockeye weight was reflected in an increase in the share of the total United States catch taken by the gill net fleet from 21.12 per cent in 1960 to 35.00 per cent in 1964 (Table I).

Cyclical Average Weights of Four-Year-Old Fraser River Sockeye

Cycle Year	*Average Weight Pounds*	*Cycle Year*	*Average Weight Pounds*	*Cycle Year*	*Average Weight Pounds*
1916	5.86	1932	6.45	1948	5.53
1920	6.02	1936	6.47	1952	6.80
1924	5.60	1940	6.35	1956	6.02
1928	6.38	1944	6.23	1960	5.19
				1964	5.83

Escapement

The net sockeye escapement to the spawning grounds of the Fraser River watershed was 431,452 fish (Table VI) or 25.0 per cent of the total sockeye run in Convention waters estimated at 1,728,150 sockeye. Actually, for reasons discussed below, the estimated net escapement should have been 635,000 sockeye out of an estimated gross escapement of 705,515. If the estimated gross escapement had been able to migrate upstream under normal water conditions and subject to a normal Indian fishery (Table V), the 1964 escapement would have approached that desired in almost all spawning areas except for those escapements destined to the later spawning areas such as Adams River, Harrison River and Weaver Creek.

Figure 1 illustrates the daily flow of the Fraser River during the sockeye escapement period compared with the long term average flow for the same period. The first peak flow in July represents a known block stage in the Fraser River Canyon during the Early Stuart escapement and part of the Bowron escapement. A delay in obtaining the necessary construction funds made it impossible to complete the high water fishway at Hell's Gate in time for this year's Early Stuart escapement. Nevertheless, 2,421 out of an estimated 32,421 sockeye did reach the Early Stuart spawning grounds and 1,500 out of an estimated 6,500 sockeye reached the Bowron area. These fish were able to pass through the left bank Yale fishway (Figure 2) and with difficulty through a rock cut at Hell's Gate made preliminary to the actual construction of the fishway which has now been completed (Figure 3). Thus there was an estimated

loss of 30,000 Early Stuart and 5,000 Bowron sockeye due to the unusual flow conditions in the Fraser River during July.

Evidence of the highly unstable freshwater environment during recent years is available from the fact that the block stage in the flow of the Fraser River to the migration of the early running sockeye has now occurred on two successive cycle years, 1960 and 1964. After 1933, a block stage flow did not occur in early July for twenty years yet it has occurred four times in the last ten years.

The first substantial escapement of 'summer' run sockeye estimated at 135,000 fish, 92,000 of which were calculated to be of Chilko origin, occurred during the weekly closure to fishing in the Fraser River from July 30 to August 2 inclusive. This escapement soon encountered an all time record flow for that time of year and this flow was accompanied by an excessive amount of silt, possibly caused to some extent by a small earth slide believed to have occurred in the Chilcotin River. This particular escapement was traced to Hope, B. C. after which contact was lost in the rapidly rising muddy waters of the Fraser River. These fish were not detected in volume at either Hell's Gate, Bridge River Rapids or the Chilcotin River at the scheduled time. How many of these fish actually were lost is not known since at least some of them may have gone upriver after the flow and related silt subsided about a week later. The effect of this delayed migration was evident from the fact

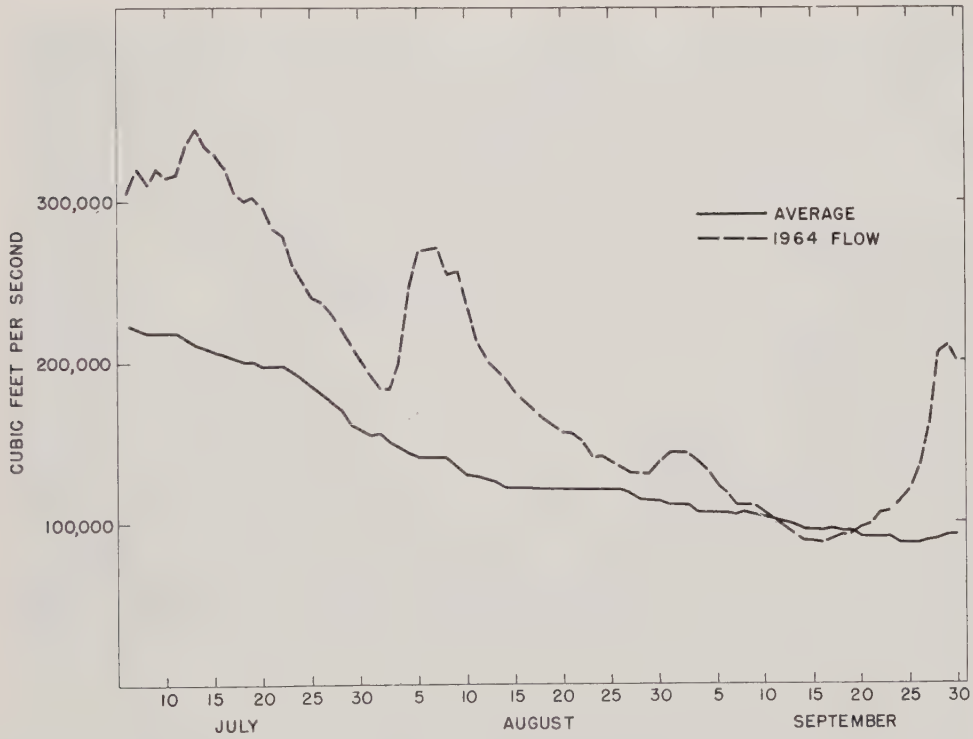

FIGURE 1 — Daily flow of Fraser River at Hope, B.C. in 1964 compared with long term average.

FIGURE 2 — High water block stage fishway at Yale Rapids, Fraser Canyon. Completed March 31, 1964.

FIGURE 3 — High water block stage fishway at Hell's Gate, Fraser Canyon. Completed March 1, 1965. This fishway, located on the right of the picture, will operate between river levels 70 to 92. The small center fishway, built in 1951, operates between river levels 54 to 70 while the main fishway, completed in 1945, operates from river level 54 down to 18. The extreme annual variation in the river flow is evident in the picture which was taken during winter low water when all three fishways were dry.

that about 1,000 fish, mainly of the Chilko origin, were observed below the Mission dam on Bridge River near Lillooet, B. C., far below the mouth of the Chilcotin River.

The principal 1964 Chilko escapement mixed with much smaller numbers of other summer run races occurred during the extended weekly closure from August 6 to 11 inclusive. An estimated 315,000 sockeye migrated upstream during the above referenced closure. River flow conditions and the timing of the upstream migration approached normal with the result that this large body of fish arrived according to schedule at Hell's Gate and Bridge River Rapids near Lillooet, B. C.

The first part of the large Chilko escapement was due to arrive on August 21 at Farwell Canyon located about eight miles up the Chilcotin River from its confluence with the Fraser River. On August 19 at about 10:00 p.m. an estimated 10,000,000 cubic yards of material, mostly earth, slid across the Chilcotin River, practically drying it up for about five hours (Figure 4). As soon as the water topped the earthen dam, 70 feet in depth, a great mass of mud passed downstream with 580,000 cubic yards being washed out in the three days of August 20-22. Upstream migration of all fish in the lower Chilcotin River was held up until August 27 when the silt content of the water dropped below 4,000 ppm.

The character of the obstruction was such that it was believed the fish could have passed the slide within 24 hours after it happened but were held up a total of six days by the heavy flow of silt rather than by any obstruction. Practically all fish passing the slide area showed nose and head injuries. However, water temperatures were below normal and almost all of the 238,601 fish, eventually recorded on the spawning ground, spawned successfully.

Apparently some Chilko sockeye were lost as a result of the slide, for it was noted later on the basis of scale identification that 1,032 fish strayed to the Horsefly River, 198 fish to the Stellako River, and 390 fish to the Middle and Tachie River areas. Just how many sockeye were lost due to the early August high water, and how many were lost because of the Chilcotin slide will never be known, but an estimated total of 129,000 fish of all races were lost due to unusual river flow conditions which existed during the 1964 escapement period.

Normally the Indian subsistence fishery takes from 8 to 12 per cent of the total escapement. In 1964 the Indian catch increased to 20.5 per cent of the total estimated gross escapement. This increase in the Indian catch reduced the expected net escapement by an additional 74,300 sockeye, which, added to the 129,000 fish lost due to unusual flow conditions, makes up the difference between the expected net escapement of 635,000 sockeye and the actual number recorded on the spawning grounds (Table VI). The Chilko sockeye escapement to the spawning grounds would have been about 375,000 instead of the 238,601 fish recorded if normal conditions for migration had prevailed and if the Indian fishery had operated at its usual efficiency.

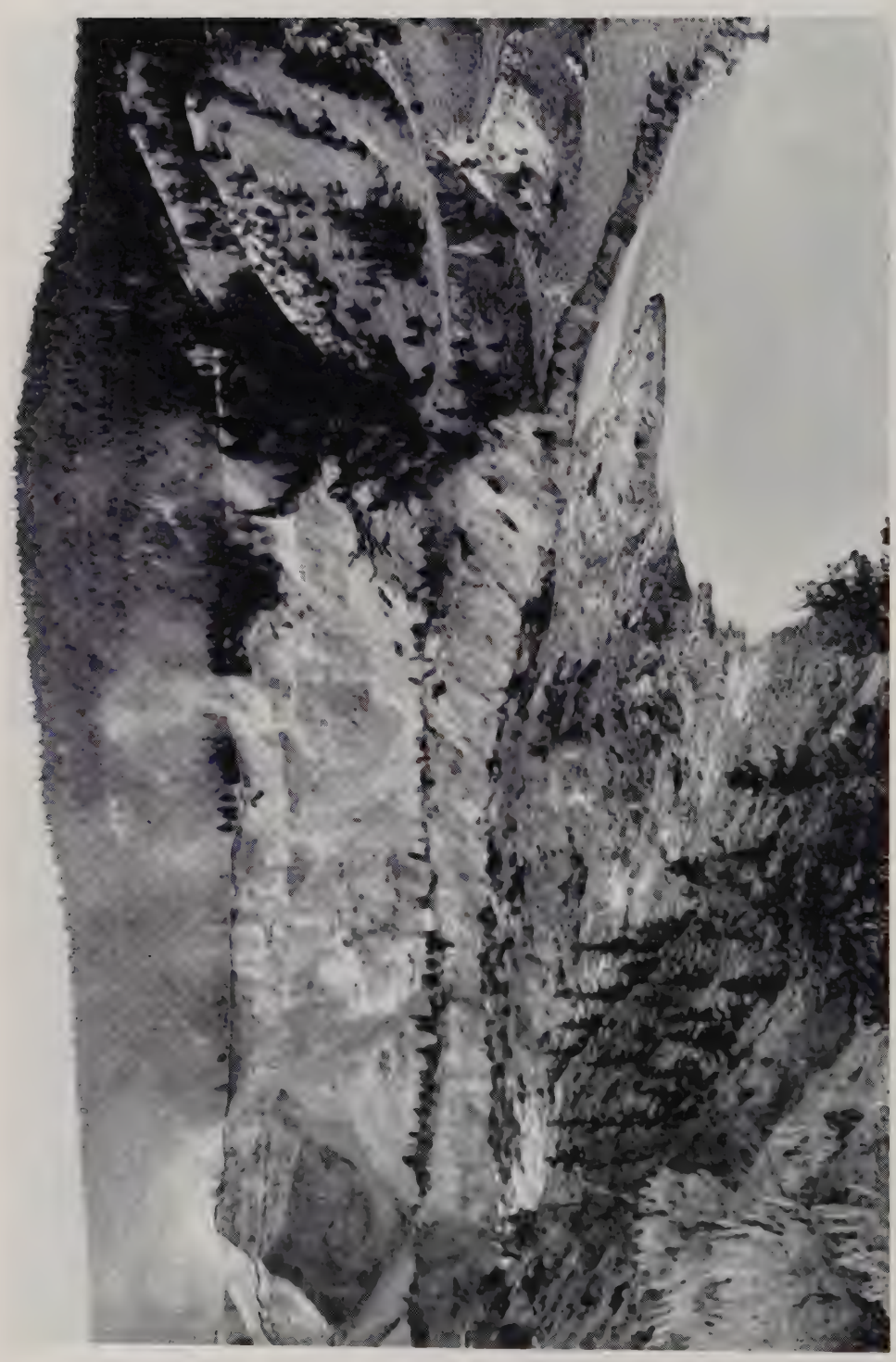

FIGURE 4—Picture of slide which occurred August 19 on the Chilcotin River at Farwell Canyon, eight miles upstream from the Fraser River. This slide estimated at 10,000,000 cubic yards created an earthen dam 70 feet high which blocked the flow of the Chilcotin River for five hours and held up the upstream movement of Chilko sockeye for six days due to the heavy silt content of the river below the slide area.

The successful spawning of the 1964 Chilko escapement combined with the high pre-spawning mortality of the large Chilko escapement in 1963 should restore the natural balance of the annual Chilko year classes within the quadrennial cycle. The 1963 cycle run is expected to revert to a subdominant status in 1967 followed by a return to dominance of the 1968 cycle run.

Rather sizeable runs of sockeye returned to Gates Creek and to the Birkenhead River, the latter spawning area now showing an increase in escapement for the fourth consecutive year. It has been concluded on the basis of a careful analysis of the assembled data that the productivity of the Birkenhead River sockeye run was lowered substantially by flood control work started in 1948 which diverted the lower river to a new channel having its confluence in Lillooet Lake. The eventual lowering of Lillooet Lake as part of the flood control project increased the water velocity in the new channel causing a gradual deposition of good spawning gravel over the original mud bottom. Sockeye are now spawning heavily in the new channel and this occurrence of large numbers of spawners in the newly created spawning gravel beds has been coincident with a continuing increase in the size of the Birkenhead sockeye run.

An unusually large number of three-year-old sockeye commonly referred to as 'Jacks' returned to the Horsefly River in 1964. The value of Horsefly jacks as an indicator of the size of the run in the following year will receive a good test in 1965. In recent years the number of jacks returning to Chilko and Adams Rivers has proven to be a fair indicator of the size of the adult runs in the following year.

The runs of late spawning fish and their related escapements, while normally small on this cycle, were very small, particularly those of Harrison River, Weaver Creek, and Adams River origin.

Rehabilitation

The Commission reported previously that temporarily it has abandoned any attempt to transplant sockeye to barren areas. Attempts to transplant runs using hatchery reared fingerlings has not been successful and the transfer of eyed eggs to now barren spawning areas has met with only meagre success. Currently, the weaknesses of hatchery methods and the ecological characteristics of artificial spawning and incubation channels are being studied so that new methods for transplanting sockeye populations can be developed which should have a higher probability of success. Small runs of sockeye have been initiated by eyed egg transfers in a few once-barren streams and their future progress under natural reproduction will be of scientific and possibly of economic importance.

In 1960 several eyed egg transplants were made and the following is a report on the success of these efforts.

From a transplant of 253,000 eyed eggs of Seymour River origin to the Upper Adams River in 1956, only one live sockeye was seen in the recipient stream in 1960. An additional transplant of 702,000 eyed eggs of Taseko Lake origin was made in Upper Adams River in 1960. In 1964, the return year, a total

of 162 sockeye were observed in Upper Adams River and seven spawned out sockeye were seen on the shores of Tum Tum Lake by a reliable observer. It appears obvious that the 1964 run to Upper Adams River increased significantly as evidenced by the 162 spawners observed in the lower part of the stream by field men of the Commission and by the unknown number returning to the Tum Tum Lake area near the headwaters of the stream.

A total of 823 sockeye were enumerated in the Momich River flowing into Adams Lake, a few miles down lake from the mouth of Upper Adams River. This return could have equalled or even exceeded the return in 1960 which was very roughly approximated at 1,000 fish. The 1960 run was reported by a Provincial Game Warden after the fish were dead and the Commission field staff could only estimate from their late observation that the run consisted of several hundred fish. In earlier years no sockeye were observed or reported in this stream and the question arises as to whether this run could have been established by strays returning from earlier transplants to Upper Adams River. If sockeye appear in the Momich River on other cyclical years when transplants were made to Upper Adams River, corroborative evidence of the possibility of straying would become available.

In 1956, a total of 316,000 Raft River sockeye eggs were eyed on the Barriere River and planted in that stream. In 1960 a total of 23 sockeye returned and spawned in the main Barriere River. A second transplant of 1,083,000 eyed eggs of Raft River origin was made in the main Barriere in 1960 as a supplement to the natural production from the 23 sockeye returning in that year. The Barriere run increased to 85 sockeye in 1964 plus 146 sockeye which proceeded upstream and spawned in Fennell Creek, tributary to North Barriere Lake. No spawners were observed in Fennell Creek in 1960.

Operations continued on an experimental basis at the Upper Pitt River hatchery. A total of 2,967,000 eyed eggs were incubated, during the fall of 1963, in the new artificial gravel incubation channel. In the spring of 1964 a total of 2,250,270 fry emerged and migrated from the channel for a survival rate of 75.84 per cent. The time of emergence of the artificially incubated fry coincided with the emergence curve of wild fry produced from naturally spawned eggs. This similarity in emergence timing is believed to be a major breakthrough in eliminating the precocious development of the alevin which takes place in hatchery operations. Hatchery fry develop several weeks earlier than wild fry resulting in smaller and weaker fry not normally timed with their lake rearing environment. Hatchery fry also have had a very poor survival rate — at least that was the case in earlier Fraser River hatchery operations which were suspended by the Government of Canada in 1937.

In the fall of 1964, a total of 3,465,000 eyed sockeye eggs were planted in the artificial incubation channel on Upper Pitt River. Latest reports indicate that the survival rate appears excellent and that more fry will be produced from this 6,460 square foot area than from the natural spawning in all of Pitt River and its tributaries. This was the case in 1963 and now there is every reason to anticipate that returning runs to Upper Pitt River will be increased substantially. Since the experimental data shows no apparent difference between the

fry produced in the incubation channel and those produced by natural spawning, it would be expected that the fry produced in the incubation channel would have the same survival rate to adults as that of fry produced naturally. Only the size of the returning adult runs can verify if the above assumption is correct and that the artificial incubation channel is a practical aid for protecting and increasing Fraser River sockeye runs — something that the hatcheries did not do when operated in certain areas of the Fraser River watershed.

While artificial *incubation* channels have yet to be proven as a successful method for increasing salmon runs, the artificial *spawning* channel has shown substantial results in the case of both pink and sockeye salmon. In view of the increases in the returns from pink salmon spawning in the Jones and Seton Creek channels and from sockeye spawning in the Baker Lake channel in the State of Washington, the Commission has decided to build a large scale spawning channel adjacent to Weaver Creek.

The Weaver Creek natural spawning grounds have deteriorated so badly from extreme winter floods and occasional low flows during the sockeye spawning period that the future of the Weaver Creek sockeye population is in jeopardy. In addition to the need for artificial stabilization of spawning conditions on this stream there also is a need for supplying increased numbers of sockeye fry to utilize fully the natural rearing capacity of Harrison Lake. An analysis of the rearing capacity of Harrison Lake indicates that this lake could support a sockeye spawning population of not less than 210,000 females or a total of both sexes of over 400,000. A maximum of 70,000 female sockeye have spawned in the Harrison Lake system in the last 12 years, leaving a wide margin between the actual and potential utilization of the lake rearing area.

A contract has been awarded for the construction of water storage facilities on Weaver Lake and an artificial spawning channel 20 feet wide and 9,000 feet long to be located near the mouth of Weaver Creek. The channel will have a capacity of over 10,000 female spawners and most of the favorable natural spawning grounds will remain available for natural spawning to be improved by the release of Weaver Lake storage water during periods of low flow.

The minimum value of increased sockeye production resulting from the proposed channel is calculated at $390,000 annually which would provide a minimum cost/benefit ratio of 1 to 10. Theoretically, the cost/benefit ratio could be as high as 1 to 70. Unless unforeseen difficulties are encountered in construction it is expected that the channel will be in operation in time for the 1965 sockeye run.

PINK SALMON REPORT

In view of the inverse relationship established between adult survival of Fraser River pink salmon and the mean water temperature of Georgia Strait during the estuarial existence of young pink salmon, it is important to the accurate prediction of run size that an estimate be made of the number of fry leaving the Fraser River. Three fry enumeration stations were established in the spring of 1962 when the fry from the 1961 spawning emerged from their gravel areas

and emigrated to Georgia Strait. These stations were located on the lower Harrison and Vedder Rivers where the large majority of late run pink salmon spawn and on the main Fraser River at Mission, B.C. Estimates of abundance at Mission include the total fry production from both early and late spawning runs to the entire Fraser River watershed.

The enumeration of pink salmon fry emigrating in large river systems such as the Fraser River can be exceedingly difficult but it is believed that the present fry enumeration methods developed by the Commission will produce sufficiently accurate data for use in the prediction of total adult survival. The following table gives the comparative results of the enumeration efforts in 1962 and 1964.

Stock	*Fry in Millions* 1962	1964	*Per Cent Increase in 1964*
Early Fraser	122.0	169.9	39.3
Late Fraser	59.5	96.5	62.2
Total Fraser	181.5	266.4	46.8

Stock	*1961 Escapement*	*Fry Per Spawner 1962*	*1963 Escapement*	*Fry Per Spawner 1964*
Early Fraser	700,729	174	961,804	177
Late Fraser	393,376	151	991,528	97
Total Fraser	1,094,105	166	1,953,332	136

Stock	*1961 Escapement*	*Fry Per Spawner 1962*	*1963 Escapement*	*Fry Per Spawner 1964*
Harrison R.	198,597	168	658,563	101
Vedder R.	194,779	133	332,965	60
Total Late Fraser	393,376	151	991,528	97

An analysis of the data in the above table indicates several items of importance besides a substantial increase in the 1964 fry production over that recorded in the spring of 1962. The number of fry-per-spawner did not decrease in the case of the Early Fraser pink run even though the number of spawners increased from 708,267 in 1961 to 972,879 in 1963. The lack of a decline in the fry-per-spawner in spite of an increase in the number of early spawners provides evidence that, in general, the early run spawning areas are far from being overcrowded and increased escapements of these fish are required.

In the case of the late run spawning in the relatively stable Harrison River, the fry-per-spawner declined significantly with a sizeable increase in the spawning population. This decrease in the fry-per-spawner indicates the possibility that the pink salmon escapement to the Harrison River in 1963 approached or exceeded the desired maximum. An even greater decline occurred in the fry-per-spawner recorded for the Vedder River. In the latter case a major flood occurred during and immediately after the 1963 spawning which complicates any attempt to differentiate between the effects of the increased number of spawners and the effects of the high water.

Now that total fry data are available for the Fraser River pink salmon, it will be interesting to note how accurately they reflect the size of the returning adult runs after the number of fry have been weighted by the mean water temperature in Georgia Strait.

The Seton Creek artificial spawning channel operated for the second time in 1963. In its annual report for that year the Commission noted that a structural failure of the closed entrance gate allowed a total of 14,106 pink salmon to enter the spawning channel, a number greatly in excess of the calculated spawning capacity; also that winter sampling of the area indicated that there would be a lower survival rate than the 52.4 per cent recorded in 1962. A total of 16,022,000 eggs were deposited in the channel in the fall of 1963 with 3,480,325 fry counted out in the spring of 1964 for an egg-to-fry survival rate of 21.72 per cent. Since an analysis of the water flow pattern through the gravel in the channel showed no difference in 1964 from that in 1962 it may be assumed that the decline in egg-to-fry survival from 52.4 per cent in 1962 to 21.72 per cent in 1964 was caused entirely by too many spawners. Thus, the loss of fry due to excess pink salmon spawners is emphasized by the fact that in 1961 6,711 spawners produced 3,592,000 fry the following spring while 14,106 spawners in 1963 produced only 3,480,325 fry. All controlling factors except the number of spawners were considered equivalent for both years.

An extensive comparison of the fry produced in the Seton artificial spawning channel with the fry produced from natural spawning in Seton Creek permitted the following conclusions:

1. Length and weight comparisons throughout the period of emergence showed no difference between the two groups.
2. No difference existed in the emergence time of the two groups.
3. Behavior of the fry leaving the artificial spawning channel was the same as that for the wild fry emigrating from Seton Creek.

Each year the proposed late season fishing closure of the West Point Roberts area adjoining the Canadian area off the mouth of the Fraser River is the subject of considerable discussion on the part of the U.S. fishermen. In the case of the late running sockeye this closure is particularly important in the year of the large Adams River run which drifts off the mouth of the Fraser River for about three weeks before proceeding upstream. During this drifting period strong tides accompanied by northwest winds can cause what is known as a "blowback" of these schooled sockeye into the West Point Roberts fishing area where they are very vulnerable to the United States fishing fleet which has already harvested its share of these fish. Tagging has shown that sockeye move through the Point Roberts area without stopping but are subject to a "blowback" from Canada under the defined conditions when they delay off the mouth of the Fraser River. When there is no blowback only 4.8 per cent of the sockeye tagged off Point Roberts are recovered at Point Roberts.

In the case of pink salmon, which are abundant only in the odd-numbered years, many fish actually delay their migration at Point Roberts, not entering

Canadian waters until they approach the time for moving up the Fraser River. The temporary stoppage in the forward migration of pink salmon in the Point Roberts area is revealed by the fact that 33.7 per cent of the pink salmon tagged at Point Roberts were recovered at Point Roberts in spite of the fact that the area westerly of a line projected from the Iwersen dock to Active Pass was closed to fishing at the time. It is for this reason that the South Beach area of Point Roberts, an excellent purse seine fishing area, is closed during the latter part of the early pink salmon run. Without the closure of South Beach as well as West Point Roberts, the United States fishermen would continue to exploit the same fish making it practically impossible to increase the escapement to the level required for full rehabilitation.

Once the Fraser River pink salmon runs approach their maximum potential the Commission anticipates the possibility that a closure of South Beach may not be required. On this basis the period of closure was reduced by two weeks in the 1965 regulations since the late running pinks had what was considered a maximum escapement in the brood year. This was not the case with the Early Fraser run and an increase of almost 100 per cent in the 1965 escapement over that in 1963 is considered necessary for rebuilding the runs to a size that existed in earlier years.

WATERSHED PROTECTION

Negotiations by the Canada Department of Fisheries with two companies planning pulp mills on the Fraser River system at Prince George and Kamloops continued during 1964. Early in the year agreement in principle was reached with each company, with respect to in-plant chemical recovery processes and the method of handling and treating the final wastes to be discharged to the river system. The negotiations following these agreements have been concerned with the details of the facilities to be provided. A third company announced its intentions to construct a pulp mill near Prince George. Preliminary discussions were held with this company late in the year and satisfactory agreement should be reached early in 1965 on all major details of the waste handling and treatment facilities. Late in the year, there were indications that two additional pulp mills might be built; one near Quesnel and the other near Prince George.

This tremendous surge in growth of the pulp industry in the northern part of the Fraser River watershed could have created very serious pollution of the Fraser River if the policies of the Canada Department of Fisheries had not been implemented. Research undertaken by the Commission has provided badly needed information on the effects of kraft pulp wastes on juvenile and adult sockeye and pink salmon and pink salmon eggs, and also on the effectiveness of the required waste treatment in alleviating these effects. This research provides confidence within the limits of present knowledge that the required treatment of the wastes will protect the sockeye and pink salmon runs of the Fraser River system. There remains the serious question as to how much additional domestic and industrial waste could be put in the river without affecting the salmon runs. The Commission is continuing with its program of investigation of the long range effect of pollutants on the Fraser River sockeye and pink salmon during the various stages of their freshwater existence.

Another phase of the growth of the forest industries is the increasing interest in the use of rivers for the transportation of logs. Logs and log bundles have been driven through the Fraser Canyon for a period of ten years. While there is no direct evidence that this log driving is affecting sockeye or pink salmon in any way, the logs are damaging the fishway structures at Hell's Gate, and considerable repair has to be done each year to keep the structures in good operating condition. In recent years there have been small log drives on the Quesnel, Tachie and Nadina Rivers, all subject to conditions specified by the Canada Department of Fisheries. During 1964 a proposal was made for driving logs down the Stellako River, and there were indications of interest in increasing the log drive in the Tachie River, and starting log drives in Middle River. The Commission is seriously concerned over the damage to sockeye and pink salmon stocks that could be done by log driving. In order to protect these stocks, it considers it essential that there should be no log driving over the spawning grounds of these fish. The Commission, in cooperation with the Canada Department of Fisheries is preparing a comprehensive report which will present in detail the basis for its conclusions.

The use of Harrison River for transport of logs from Harrison Lake to the Fraser River has resulted in periodic dredging below and in the rapids section of the river during past years. This section of the river is a spawning ground for large runs of both sockeye and pink salmon as well as other salmon, and the Commission is concerned over possible lowering of water levels over these spawning grounds as a result of dredging, particularly at the upper end of the rapids. Dredging in the Harrison spawning area was halted during 1964 at the request of the Canada Department of Fisheries, and arrangements were made for a cooperative study of this section of the river by the Canada Department of Public Works and the Canada Department of Fisheries and the Commission to determine the effects of dredging on river levels. This survey and study will be done early in 1965.

In March, unauthorized channel and dyke construction in the Chilliwack River below Vedder Crossing resulted in drying up of channels in the river in which pink salmon had spawned in the fall of 1963. This work proceeded unobserved until it was completed, and as a result about 30 million pink salmon eggs were lost. This is yet another example of the damage that can be done to a fishery by irresponsible actions.

Construction of the fishway and rock cut on the left bank of the Fraser River at Yale Rapids was completed by the end of March. The operating range of the fishways on the right bank was extended to lower river levels by a rock cut which was completed before high water. These facilities now provide passage for salmon on the right bank over the range of river levels from gauge 53 to 78 at Hell's Gate, and on the left bank over the range from gauge 61 to 92. These ranges cover the levels on each bank at which sockeye encountered difficulty at Yale Rapids.

The rock cut for the Upper Level Fishway at Hell's Gate was completed by the end of March, and a contract for the completion of the fishway was let in May. Work was delayed by the exceptionally high and prolonged freshet of

the Fraser River, but by the end of the year the structure was well advanced and it will be completed by the end of March, 1965.

The planning and investigational program of watershed improvement continued during the year. Surveys were made of possible spawning channel sites on the Nadina, Raft and Barriere Rivers, and temperature and stream flow records were obtained for evaluation of these projects. Detailed reports on these proposals will be submitted to the two governments in 1965. Study of possible temperature control projects for the Horsefly River continued with collection of data and study of alternative projects for use in the event temperature control is established as being the proper remedial action on this river for reducing the mortality of unspawned sockeye.

The large slide on the Chilcotin River previously referred to, was considered passable to sockeye within two days after it occurred, and remedial action was not considered necessary or even possible. Sockeye were able to migrate up the river as soon as the silt concentration decreased to a level which did not hinder the migration. A joint report was prepared by engineers of the Canada Department of Fisheries and the Commission presenting probable causes of the slide and a program for future action. The status of the river bed and banks at the slide will be carefully checked during 1965 to ensure continued passage for sockeye at this point.

1964 PUBLICATIONS

1. Annual Report of the International Pacific Salmon Fisheries Commission for 1963.

2. Research Bulletin Number XV.
The Migration and Exploitation of Pink Salmon Runs in and Adjacent to the Fraser River Convention Area in 1959 by E. H. Vernon, A. S. Hourston and G. A. Holland. Published by authority of the Pink Salmon Co-ordinating Committee.

3. Research Bulletin Number XVI.
Limnology of Kamloops Lake by F. J. Ward.

4. Progress Report Number 11.
Cyclic Dominance in Adams River Sockeye Salmon by F. J. Ward and P. A. Larkin.

5. Administrative Report on Proposed Artificial Spawning Channel for Weaver Creek Sockeye Salmon (restricted circulation).

Table 1
SOCKEYE CATCH BY GEAR

United States Convention Waters

	Purse Seines			Gill Nets			Reef Nets			Total
Year	*Units*	*Catch*	*Percentage*	*Units*	*Catch*	*Percentage*	*Units*	*Catch*	*Percentage*	*Catch*
1964	96	284,209	55.94	337	177,767	34.99	48	45,827	9.02	508,087
1960	199	843,850	70.38	422	253,211	21.12	63	100,915	8.42	1,198,969
1956	164	428,562	47.26	491	371,729	40.99	85	106,581	11.75	906,872
1952	207	826,304	74.21	195	175,064	15.72	66	112,107	10.07	1,113,475

Canadian Convention Waters

	Purse Seines			Gill Nets			Traps			Total
Year	*Units*	*Catch*	*Percentage*	*Units*	*Catch*	*Percentage*	*Units*	*Catch*	*Percentage*	*Catch*
1964	27	7,409	1.44	1,038	503,690	97.89	0	0	0	514,548
1960	77	353,482	28.16	1,466	898,826	71.61	0	0	0	1,255,195
1956	50	216,388	24.18	1,151	678,074	75.78	0	0	0	894,836
1952	41	122,114	10.58	1,470	966,852	83.75	5	65,417	5.67	1,154,383

NOTE: Gear counts represent the maximum number of units delivering sockeye on any single day.
Unlisted troll catches of sockeye included in figures for total catch.

Table II

CYCLIC LANDINGS AND PACKS OF SOCKEYE FROM CONVENTION WATERS

	United States	*Canada*	*Total*
1964			
Total Landings (No. Sockeye)	508,087	514,548	1,022,635
Share in Fish	49.68%	50.32%	
Total Pack (48 Lb. Cases)	43,001	44,899*	87,900
Share in Pack	48.92%	51.08%	
1960			
Total Landings (No. Sockeye)	1,198,969	1,255,195	2,454,164
Share in Fish	48.85%	51.15%	
Total Pack (48 Lb. Cases)	96,627	98,795	195,422
Share in Pack	49.45%	50.55%	
1946-1964			
Total Landings (No. Sockeye)	31,924,202	31,257,642	63,181,844
Share in Fish	50.53%	49.47%	
Total Pack (48 Lb. Cases)	2,803,947	2,703,170	5,507,117
Share in Pack	50.91%	49.09%	
1964 *Cycle Catch*			
1964	508,087	514,548	1,022,635
1960	1,198,969	1,255,195	2,454,164
1956	906,872	894,836	1,801,708
1952	1,113,475	1,154,383	2,267,858
1948	1,089,091	752,691	1,841,782
1944	435,443	1,003,826	1,439,269
1940	654,091	1,033,000	1,687,091
1936	453,025	2,126,074	2,579,099
1932	853,406	733,735	1,587,141
1928	630,457	311,226	941,683
1924	772,056	442,250	1,214,306
1920	677,690	532,039	1,209,729
1916	909,425	376,891	1,286,316
1912	2,005,869	1,357,425	3,363,294
1908	1,879,268	870,612	2,749,880
1904	1,506,137	892,934	2,399,071

*Includes 605 cases packed in Canada from sockeye caught in the United States.

Table III

DAILY CATCH OF SOCKEYE, 1952-1956-1960-1964 FROM UNITED STATES CONVENTION WATERS

Date	JULY				AUGUST				SEPTEMBER			
	1952	1956	1960	1964	1952	1956	1960	1964	1952	1956	1960	1964
1	5,011				40,805	59,168	117,041		711		3,777	378
2	8,640	4,286				41,245	54,285		597			377
3	7,943	3,885					45,840	79,585	432	1,418		
4	4,857	2,365			32,815		45,845	73,612	434	606		
5		1,038		CLOSED	25,891			59,668	140	500	1,784	
6					16,978	141,861				454	1,524	
7	14,008				18,488	98,859	194,605		722	146	1,295	
8	9,369		CLOSED		13,920		181,344		201		614	163
9	8,090	2,429					126,087		573			152
10	6,796	1,803					96,389		636	78		83
11	4,187	2,189			6,865		65,882		557	58		
12		1,423			7,055		42,416		410	33	CLOSED	
13				3,118	2,697	24,347		25,336		119		
14	9,159			1,463	2,712	21,450			434	100		314
15	10,812				2,831	12,509			299			48
16	13,794	4,677				9,102			272			104
17	16,876	8,146						15,456	193	43		143
18	11,786	12,101	6,574		4,096			12,122	202	146		
19		15,053	6,329		3,143		CLOSED	5,160	151	49	50	
20			6,823	6,956	2,730	13,151				23	130	
21	90,696		7,550	8,672	967	8,831			117	37	56	50
22	32,619			16,773	612	4,955			135		38	49
23	34,320	78,518				2,252			85			61
24	110,491	59,695						5,773	48	3		13
25	134,294	39,052	78,450		220			1,845	47	3	CLOSED	
26		31,635	38,405		720			1,205	34	4		
27			33,335	79,632	1,167	651				5		
28	128,339		32,087	54,204	1,310	727			20	5		22
29	100,767			53,412	931	389	3,587		20			6
30	96,565	113,200				524	2,064		31			4
31	56,664	70,572			654		3,024	681				
Totals	916,083	452,067	209,553	224,230	187,607	440,021	978,409	280,443	7,501	3,830	9,268	1,967
Troll and outside seine			142	165	2	3,816	851	113	17	34		
Monthly Totals	916,083	452,067	209,695	224,395	187,609	443,837	979,260	280,556	7,518	3,864	9,268	1,967
June, Oct. & Nov. Totals									2,265	7,104	746	1,169
Season Totals									1,113,475	906,872	1,198,969	508,087

TABLE IV

DAILY CATCH OF SOCKEYE, 1952-1956-1960-1964 FROM CANADIAN CONVENTION WATERS

Date	JULY				AUGUST				SEPTEMBER			
	1952	1956	1960	1964	1952	1956	1960	1964	1952	1956	1960	1964
1	10,225				11,392	54,068			13,562		760	1,684
2	8,532					25,441	47,301		5,599			103
3	12,241	8,554					194,327	114,881	3,343			
4	1,184	4,731	7,347					42,299	6,475	4,403		
5		6,501	6,170	CLOSED	108,955			22,772	10	1,448	491	
6			4,544		36,472						222	
7	13,476				23,048						71	2,491
8	10,009				911	154,050	108,471		8			664
9	8,732					78,176	208,985		7			23
10	9,000	4,773					87,843		7			
11	1,317	2,782	8,358		38,878		34,455		11	584		
12		2,474	4,686		12,321			102,832	12	260	1,402	
13			4,341	2,441	11,433			28,793			464	
14	13,063				9,381	53,080					32	9
15	8,249				110	15,765			28			9
16	13,221						96,388		28			
17	22,896	7,570					45,676	35,135	27			
18	11,729	7,067	11,420		17,786		56,111	15,025	17			
19		9,459	14,424		9,714			5,341	17	6,916	CLOSED	
20			24,164	6,922	6,218					2,753		
21	5,299			8,331	5,443	17,444						1,393
22	5,299				67	5,804	53,752					
23	5,299						17,274					1
24	39,207	57,027						20,527		1,383		1
25	48,841	22,609	84,939		21,489			7,093	1	193		3
26		29,237	51,124		9,583			953	1	94		
27			60,451	49,543	6,535					29		
28	211,103			13,561	5,162	6,907					614	
29	109,483			12,826	13	2,863	2,292		2		185	0
30	79,096						806		2			0
31	120,159	181,981					885	4,927				
Totals	767,660	344,765	281,968	93,624	334,911	413,598	954,566	400,578	29,157	18,063	4,241	6,381
Troll and outside seine		91	670	1,775	811	111,659	2,092	1,637		57	109	15
Spring salmon gill nets				675			253			220	268	565
Monthly Totals	767,660	344,856	282,638	96,074	335,722	525,257	956,911	402,215	29,157	18,340	4,618	6,961
June, Oct. & Nov. Totals									21,844	6,383	11,028	9,298
Season Totals									1,154,383	894,836	1,255,195	514,548

Table V

THE INDIAN CATCHES OF SOCKEYE SALMON BY DISTRICTS AND THE VARIOUS AREAS WITHIN THESE DISTRICTS, 1960, 1964

	1960		1964	
District and Area	*Catch*	*No. of Fishermen**	*Catch*	*No. of Fishermen**
HARRISON-BIRKENHEAD				
Skookumchuck and Douglas	1,087	—	1,460	13
Birkenhead River and Lillooet Lake	5,310	—	5,800	37
Harrison and Chehalis	325	—	800	42
TOTALS	6,722	42	8,060	92
LOWER FRASER				
Coquitlam to Chilliwack	13,550	—	21,150	105
Chilliwack to Hope	5,276	—	20,875	114
Vedder River and Vicinity	199	—	700	18
TOTALS	19,025	268	42,725	237
CANYON				
Hope to Lytton	18,055	99	58,450	172
TOTALS	18,055	99	58,450	172
LYTTON-LILLOOET				
Lytton to Lillooet	3,600	35	5,194	36
TOTALS	3,600	35	5,194	36
BRIDGE RIVER RAPIDS				
Rapids	8,400	135	10,906	75
Pavillion	4,000	10	4,800	33
TOTALS	12,400	145	15,706	108
CHILCOTIN				
Farwell Canyon	3,006	—	203	10
Hances Canyon	3,533	—	3,324	11
Alexis Creek	4,134	—	927	24
Siwash Bridge	3,945	—	1,762	15
Keighley Holes	2,756	—	558	5
TOTALS	17,374	73	6,774	65
UPPER FRASER				
Shelley	68	—	36	11
Alkali and Canoe Creek	250	—	3,225	28
Chimney Creek	2,585	—	725	32
Soda Creek	225	—	425	16
Alexandria	165	—	50	4
Quesnel	375	—	250	7
TOTALS	3,668	84	4,711	98
NECHAKO				
Nautley Reserve	1,009	10	1,257	15
Stella Reserve	1,230	9	791	18
TOTALS	2,239	19	2,048	33
STUART				
Fort St. James	937	21	224	50
Tachie, Pinchi and Trembleur Villages	726	20	287	82
TOTALS	1,663	41	511	132
THOMPSON				
North Thompson River	325	20	395	26
South Thompson River	485	47	200	109
Thompson River	900	87	200	168
TOTALS	1,710	154	795	303
GRAND TOTALS	86,456		144,974	

* Number of permits issued to Indians in district.

The Indian catch statistics detailed above are obtained principally from the Protection Officers of the Canadian Department of Fisheries. These officers control the taking of sockeye for food by the Indian population residing throughout the Fraser River watershed.

TABLE VI

SUMMARY OF THE SOCKEYE ESCAPEMENT TO THE FRASER RIVER SPAWNING AREAS, 1952, 1956, 1960, 1964

District and Streams	1964 Period of Peak Spawning	Estimated Number of Sockeye				Jacks	Sex Ratio	
		1952	1956	1960	1964		Males 4-5 yr.	Females 4-5 yr.
LOWER FRASER								
Cultus Lake	——	18,910	14,133	17,689	11,143	76	4,857	6,210
Upper Pitt River	Sept. 13-16	48,887	32,258	24,511	13,804	48	7,399	6,357
Widgeon Slough	Nov. 3-5	1,648	1,000	400	667	7	311	349
HARRISON								
Bear Creek	——	——	——	189	41	0	18	23
Big Silver Creek	Sept. 23-25	6,031	6,187	4,522	3,926	0	1,718	2,208
Harrison River	Nov. 6-12	25,794	3,184	17,279	2,202	0	1,100	1,102
Weaver Creek	Oct. 13-15	33,983	8,472	7,042	1,370	174	479	717
LILLOOET								
Birkenhead River	Sept. 19-21	79,082	57,899	38,916	69,939	21,031	20,271	28,637
SETON-ANDERSON								
Gates Creek	Aug. 27-28	6,883	9,059	5,449	19,971	575	10,740	8,656
SOUTH THOMPSON								
Seymour River	Sept. 4-6	6,785	2,684	3,047	2,784	39	1,408	1,337
Lower Adams River	Oct. 25-30	8,692	7,512	2,152	796	124	286	386
Little River	——	1,964	661	66	0	0	0	0
Scotch Creek	——	357	163	11	0	0	0	0
South Thompson River	——	200	0	0	0	0	0	0
Upper Adams River	Sept. 3-5	0	0	Present	162	0	71	91
Momich River	Aug. 31-Sept. 2	——	——	1,000	823	0	339	484
NORTH THOMPSON								
Raft River	Sept. 4-6	15,819	9,582	5,553	5,500	24	2,532	2,944
Barriere River	Sept. 10-12	——	——	23	85	0	35	50
Fennell Creek	Sept. 1-3	——	——	0	146	0	73	73
North Thompson River	——	——	——	——	38	0	19	19
CHILCOTIN								
Chilko River	Sept. 29-Oct. 3	489,473	647,479	420,746	238,601	329	103,777	134,495
Taseko Lake	Aug. 27-Sept. 3	3,647	1,995	2,524	433	0	189	244
QUESNEL								
Horsefly River	Sept. 10-12	7,013	2,944	3,087	19,800	18,594	770	436
Mitchell River	——	——	14	5	169	169	0	0
Little Horsefly River	Sept. 25-27	——	——	23	355	217	56	82
NECHAKO								
Endako River	——	146	18	0	7	0	3	4
Nadina River (Early)	Aug. 24-Sept. 1	1,677	1,311	1,566	1,397	2	462	933
Nadina River (Late)	Sept. 16-20			157	232	23	93	116
Nithi River	Aug. 23-26	45	36	31	13	0	6	7
Ormonde Creek	Aug. 29-Sept. 1	996	331	158	180	0	49	131
Stellako River	Sept. 26-30	40,462	38,459	38,884	31,047	157	14,361	16,529
STUART								
Early Runs								
Driftwood River	——	38	50	34	2	2	0	0
Forfar Creek	Aug. 14-17	6,975	5,497	1,755	27	0	12	15
Gluske Creek	Aug. 12-17	5,911	4,619	2,138	218	10	91	117
Kynoch Creek	Aug. 12-17	13,439	9,535	4,154	1,147	5	526	616
Narrows Creek	Aug. 14-17	1,453	697	598	22	2	9	11
Rossette Creek	Aug. 12-16	3,575	3,863	4,558	952	11	386	555
Shale Creek	——	414	185	139	27	1	13	13
Misc. Streams	——	1,775	711	1,196	26	0	11	15
Late Runs								
Kazchek Creek	——	295	223	5	0	0	0	0
Middle River	Sept. 20-25	476	500	1,056	743	31	414	298
Tachie River	Sept. 26-30	364	600	1,687	1,157	53	578	526
Sakeniche River	——	——	131	0	0	0	0	0
NORTHEAST								
Upper Bowron River	——	18,672	6,996	7,620	1,500	0	718	782
TOTALS		851,881	878,988	619,970	431,452	41,704	174,180	215,568

Table VII

DAILY CATCH OF SOCKEYE, 1949-1953-1957-1961 FROM UNITED STATES CONVENTION WATERS

Date	JULY				AUGUST				SEPTEMBER			
	1949	1953	1957	1961	1949	1953	1957	1961	1949	1953	1957	1961
1		24,386	10,165		112,059			128,699	6,451	1,307		
2		32,371	11,833		66,263			75,733	4,114	1,050	7,288	
3		39,812	13,977	47,926	66,061					1,027	25,515	
4				43,037		53,277			4,205	2,944	19,653	
5				28,585	43,876	50,531	247,511		3,630			
6		48,620				24,955	135,265		2,195	1,104		
7		69,419				24,647			1,396	780		CLOSED
8		54,566	42,804		70,218				897	757		
9		57,159	57,639		52,151				564	892	1,852	
10		31,169	23,464	143,287	31,270	35,819		82,844		509	3,333	
11	CLOSED			89,786	27,071	31,244			452	604	4,583	
12					29,923	21,641	169,312		311		1,451	
13		15,334				18,034	121,946		216	423	5	
14		26,643				16,328	71,364		47	331		
15		33,817	39,662		31,651			18,748	28	339		
16		35,230	37,687		21,509			5,241	22	228	109	
17		21,961	33,138	49,754	22,065	18,173				637	610	
18				43,233	21,059	14,384			92	17	170	22
19				34,815	17,864	16,544	49,619		119			10
20						8,017	45,223		94	60		6
21		175,068			19,173	14,939	28,689	11,491	41	22		
22		109,925	95,124		15,040		27,606	6,038	16	5		
23		165,742	78,735		16,475				28	8	24	
24			52,762	199,232	12,852	14,521				9	29	
25	3,916			117,345	9,725	8,796			23		8	11
26	43,196			73,843	12,924	6,949	22,237		25			33
27	116,793	213,804				7,891	16,538	CLOSED	24	1		10
28	82,812	147,109			8,262	6,569	12,724		6			
29	44,979	77,777	63,287		6,052		7,420		1			
30		90,768	61,061		5,768	2,574				11		
31			46,297	161,484	8,678	2,860						
Totals	291,696	1,470,680	667,635	1,032,327	727,989	398,693	955,454	328,794	24,997	13,065	64,630	92
Troll and outside seine		31,396		750	11,966	38,496		380	144	60		
Monthly Totals	291,696	1,502,076	667,635	1,033,077	739,955	437,189	955,454	329,174	25,141	13,125	64,630	92
June, Oct. & Nov. Totals										80,047	1,546	16,049
Season Totals									1,056,792	2,032,437	1,689,265	1,378,392

TABLE VIII

DAILY CATCH OF SOCKEYE, 1949-1953-1957-1961 FROM CANADIAN CONVENTION WATERS

	JULY				AUGUST				SEPTEMBER			
Date	1949	1953	1957	1961	1949	1953	1957	1961	1949	1953	1957	1961
1		33,417	19		154,935		36,393	109,677	4,683	4,397		
2		36,323	274		83,461				772	4,038	9,419	
3		2,287	1,658	36,879	68,945	91,326				4,797	4,956	
4			1,157	7,930	63,618	54,086				246	3,328	
5					50,283	48,611	83,204		5,622		1,920	53
6		72,602				38,493	138,428		2,413		1,619	18
7		36,926				6,820	52,297		1,704	6,321		
8		22,165	68		73,872				1,302	5,136		
9		27,665			35,418			28,636	177	6,556	67	
10		2,500	4,529	109,597	24,834	20,889		23,368		7,067	11,153	
11			67	27,730	36,180	60,670				89	6,060	
12				34,089	400	37,370	37,115		3,811		3,340	7
13		28,227		46,966		36,956	104,138	52,261	3,558		1,833	4
14		16,936				19,232	81,215	18,609	5,437	32		
15		21,295			32,850		85,221	21,972	4,373	14		
16		24,817	31,184		16,564			7,407	2,934	14,700	2,753	
17		4,809	17,143	86,946	15,140	31,843				8,126	4,224	
18			17,281	44,527	15,358	13,370				2	2,102	
19	2,043				1,419	10,734	24,722		2,084		763	2
20	2,102	93,156				13,397	62,386		1,709		924	3
21	1,443	128,664				7,066	40,463	17,815	1,689			2
22	1,440	112,022	72,300		15,697		31,909	5,898	1,321			
23		87,223	82,253		7,780							
24			53,025	217,241	6,792	10,945					1	
25	38,191		20,679	153,593	6,699	4,916						
26	28,963			98,121	290	2,929	25,088		6,139			11
27	49,822	40,629				4,860	12,623		1,544			
28	64,646	249,362				1,024	9,799	5,630	455			1
29	4,425	130,898	13,254		12,778		1,836	1,831	1,266			
30		140,486	83,664		4,585							
31		7,932	75,599	179,254	4,189	6,869						
Totals	193,075	1,320,341	474,154	1,042,873	732,087	522,406	826,837	293,104	52,993	61,521	54,462	101
Troll and outside seine	1,995		662	4,976	22,716	474	1,001	2,363	114		37	4,236
Spring salmon gill nets										212		625
Monthly Totals	195,070	1,320,341	474,816	1,047,849	754,803	522,880	827,838	295,467	53,107	61,733	54,499	4,962
June, Oct. & Nov. Totals									17,819	87,389	3,607	8,821
Season Totals									1,020,799	1,992,343	1,360,760	1,357,099

CLOSED — STRIKE RELIEF FISHING

CLOSED

Table IX
SUMMARY OF THE SOCKEYE ESCAPEMENT TO THE FRASER RIVER SPAWNING AREAS, 1949, 1953, 1957, 1961

District and Streams	1961 Period of Peak Spawning	Estimated Number of Sockeye			
		1949	1953	1957	1961
Lower Fraser					
Cultus Lake	Nov. 25-28	9,301	13,000	20,647	15,428
Upper Pitt River	Sept. 12-18	9,500	18,693	12,338	11,162
Pitt Lake	——	——	350	——	——
Widgeon Slough	Oct. 28-Nov. 1	650	1,518	1,200	1,293
Harrison					
Big Silver Creek	Sept. 19-26	2,100	432	389	398
Harrison River	Nov. 10-18	8,000	21,328	3,812	42,778
Weaver Creek	Oct. 18-21	12,520	9,530	20,887	4,383
Misc. Streams	——	310	86	——	11
Lillooet					
Birkenhead River	Sept. 24-28	74,300	53,111	24,168	49,627
Seton-Anderson					
Gates Creek	Aug. 29-Sept. 3	——	78	1,112	252
Portage Creek	Oct. 25-28	——	200	470	527
South Thompson					
Seymour River	Aug. 31-Sept. 2	10,772	5,947	14,095	5,822
Scotch Creek	Aug. 30-Sept. 3	1,000	1,364	2,354	598
Lower Adams River	Oct. 21-23	11,700	177,000	257,614	57,796
Little River	Oct. 21-23	9,615	32,118	34,964	8,253
South Thompson River	Oct. 21-23	5	12,614	14,645	254
North Thompson					
Raft River	Sept. 3-6	5,900	8,242	7,264	7,301
Barriere River	Sept. 6-8	——	——	38	335
North Thompson River	Oct. 1-3	——	——	——	225
Chilcotin					
Chilko River	Sept. 24-27	59,000	197,660	140,765	40,315
Taseko Lake	——	100	4,422	3,667	80
Quesnel					
Horsefly River	Aug. 28-Aug. 31	20,000	105,218	226,378	295,705
Mitchell River	Sept. 4-6	350	2,344	2,677	6,601
Nechako					
Endako River	——	1,100	605	110	0
Nadina River (Early)	Aug. 25-27	21,600	38,574	30,000	18,885
Nadina River (Late)	Sept. 20-23	——	——	29,146	17,544
Nithi River	Aug. 31-Sept. 3	1,400	1,208	1,186	146
Ormonde Creek	——	2,500	956	450	0
Stellako River	Sept. 26-29	104,800	45,057	38,922	47,241
Stuart					
Early Runs					
Ankwil Creek	Aug. 2-6	750	5,913	8,285	18,468
Bivouac Creek	Aug. 2-6	12,900	8,994	9,464	997
Driftwood River	Aug. 11-13	450	8,655	45,567	81,617
Dust Creek	Aug. 2-6	7,800	16,891	14,827	10,870
Felix Creek	Aug. 1-5	——	805	7,081	3,082
15 Mile Creek	Aug. 2-6	200	794	511	922
5 Mile Creek	Aug. 2-6	600	2,632	3,821	731
Forfar Creek	July 31-Aug. 3	80,500	18,054	17,975	13,599
Forsythe Creek	Aug. 2-6	1,200	4,500	6,385	5,836
Frypan Creek	Aug. 2-6	750	4,566	3,890	10,595
Gluske Creek	July 31-Aug. 3	106,000	16,074	21,899	5,652
Kynoch Creek	July 31-Aug. 3	185,400	16,676	13,473	16,170
Leo Creek	Aug. 2-6	1,700	6,361	10,620	1,624
Narrows Creek	Aug. 2-6	20,700	20,604	16,184	7,897
Paula Creek	Aug. 2-6	——	1,406	7,918	1,400
Rossette Creek	July 31-Aug. 3	152,900	6,355	7,087	4,993
Sakeniche River	Aug. 2-6	150	3,382	6,340	5,278
Sandpoint Creek	Aug. 2-6	——	2,092	20,914	3,523
Shale Creek	Aug. 2-6	3,000	3,809	1,606	2,392
25 Mile Creek	Aug. 2-6	3,300	2,167	724	1,663
Misc. Streams	Aug. 2-6	1,112	3,392	10,462	3,911
Late Runs					
Kazchek Creek	Sept. 15-18	1,500	7,903	19,582	15,676
Kuzkwa Creek	Sept. 18-21	——	3,686	50,006	39,245
Middle River	Sept. 15-18	126,400	235,572	332,098	177,516
Pinchi Creek	Sept. 15-18	——	72	6,390	527
Sakeniche River	Sept. 15-18	——	104	592	1,094
Tachie River	Sept. 19-24	20,000	107,506	118,252	177,047
Northeast					
Upper Bowron River	——	22,283	13,517	12,069	7,460
Totals		1,116,118	1,274,346	1,663,320	1,253,012

TABLE X

DAILY CATCH OF PINKS, 1957-1959-1961-1963 FROM UNITED STATES CONVENTION WATERS

Date	JULY				AUGUST				SEPTEMBER			
	1957	1959	1961	1963	1957	1959	1961	1963	1957	1959	1961	1963
1	1						34,070	52,307		187,274		
2							27,621	48,241	308,214	157,077		386,713
3			34			6,110			344,634			215,316
4			61			10,378			198,795			75,268
5			38		17,545	13,181		68,013				61,129
6					12,487	12,221		52,218				
7						13,229		40,441		108,145		
8						9,036		30,906		153,233	CLOSED	
9	7			CLOSED					143,732	133,600		103,803
10	1	CLOSED	494			10,105	64,389		82,101	132,028		193,448
11			398			16,642			115,338			188,781
12					24,436	17,634		102,743	56,951			
13					43,316	19,633		98,389	786			
14					57,329			84,776				
15	108						45,358			41,645		
16	235						21,451		40,133	30,919		
17	164		6,592			57,658			50,380	14,021		
18			8,234			41,664			35,730		4,023	91,403
19			12,592		99,644	36,950		173,834	146		1,790	24,221
20		1,063			89,534			166,400	49		1,265	
21		1,533			80,747		72,620	181,808		8,427		
22	1,423	1,127		7,831	110,833		51,641			8,204		
23	1,371			19,156		10,524			18,459	4,195		26
24	1,193		25,288	17,490		316,210			12,369	1,134		41
25			20,603	35,819		232,534			5,890		540	23
26			18,595	27,844	228,828	59,823	CLOSED	427,506			463	14
27		3,545		22,440	189,603	125,179		349,273			76	
28		5,506			133,673			263,222		3,790		
29	1,837	5,114		37,626	97,861			164,078		2,106		
30	3,386	4,276		44,316						2,252		12,753
31	2,848		24,759	44,595		232,046						
Totals	12,574	22,164	117,688	257,117	1,185,836	1,240,757	317,150	2,304,155	1,413,707	988,050	8,157	1,352,939
Troll	42,145	40,259	20,449	133,114	102,386	126,019	40,671	327,235	10,748	6,545	1,683	20,550
Monthly Totals	54,719	62,423	138,137	390,231	1,288,222	1,366,776	357,821	2,631,390	1,424,455	994,595	9,840	1,373,489
June, Oct. & Nov. Totals									9,970	3,741	2,746	31,122
Season Totals									2,777,366	2,427,535	508,544	4,426,232

Table XI

DAILY CATCH OF PINKS, 1957-1959-1961-1963 FROM CANADIAN CONVENTION WATERS

	JULY				AUGUST				SEPTEMBER			
Date	1957	1959	1961	1963	1957	1959	1961	1963	1957	1959	1961	1963
1	2				343		14,821			117,313		
2	1								192,149	89,335		67,539
3	1		1						180,181	99,848		182,611
4	6		1			13		5,237	147,730	19,653		210,058
5	7				20,779			31,344	91,813		3,335	178,872
6					41,304			57,540	58,796	95,733	2,198	
7					43,086			67,174		52,704		
8	6				162			775		92,362		
9	6				163		18,773		20,398	131,918		24,161
10	6		4			25,687	22,031		113,427	88,337		131,138
11	10		4			24,563			96,826	9,774		91,215
12	10		6		88,365	24,718		77,691	57,295		936	
13			29		53,273	34,625	4,954	86,575	40,518		569	
14					116,580		3,753	81,750		29,041		
15	22				79,958		80,913	106,538		57,720		
16	33						56,892		44,764	45,086		14,390
17	55		13,807			40,111			70,693	37,960		8,865
18	101		8,909			29,604			33,112	1,169		
19	19				79,913	1,749		142,007	42,847		344	
20		1,603			77,578			113,020	66,096		260	
21		1,807			91,077		15,144	125,864		20,122	431	
22	3,091	2,880			110,547		39,029	372,486		17,566		
23	7,849					201,421		187,652	1,455	36,721		71,976
24	5,078		27,564			225,659			1,628	22,104		
25	206		22,427			146,148			1,498			5,651
26			18,841		113,470	98,483		12,340	226		89	1,790
27					84,368			419,589	139		30	
28					114,618		5,480	243,875		93	22	
29	2,078				164,983		12,061	229,443		202		
30	8,170							220,827	10	63		
31	14,928		9,097			123,443						
Totals	41,685	6,290	100,690	0	1,280,567	976,224	273,851	2,581,727	1,261,601	1,064,824	8,214	988,266
Troll	3,398	27,542	26,208	100,316	30,460	179,795	34,659	214,245	4,788	44,467	20,038	106,578
Spring salmon gill nets										482	37,330	12,894
Monthly Totals	45,083	33,832	126,898	100,316	1,311,027	1,156,019	308,510	2,795,972	1,266,389	1,109,773	65,582	1,107,738
June, Oct. & Nov. Totals									12,221	13,282	44,138	169,262
Season Totals									2,634,720	2,312,906	545,128	4,173,288

CLOSED

CLOSED

Strike July 12 - Aug. 4

Strike July 26 - Aug. 9

EVERGREEN PRESS LIMITED, 1070 S.E. MARINE DR., VANCOUVER, B.C.